

15 Aug 1966

APOLLO PROGRAM DIRECTIVE NO. 21
SE015-008-1A

TO : DISTRIBUTION

FROM:


DIRECTOR, APOLLO PROGRAMSUBJECT: Monthly Weight and Performance
Data Submittal RequirementsREFERENCES: (a) SP-6004, CMO 18-001-1 Mass Properties Standard
(b) M-D-MA 500-11 / SE 010-000-1 Apollo Flight
Mission Assignments
(c) SE 005-001-1 Apollo Program SpecificationI. PURPOSE

This Directive defines the procedures to be used for reporting the weight and performance of the uprated Saturn I (Saturn IB) launch vehicle, the Saturn V launch vehicle and the Apollo spacecraft. This directive cancels and supersedes CM 005.000-1, "Weight and Performance Data Submittal Requirements", dated July 15, 1964.

II. SCOPE

A primary tool for controlling space vehicle weight is a timely and consistent weight and performance reporting system. This directive concerns only a portion of the overall reporting system. The procedures defined herein shall be used in monthly weight and performance reporting to the Apollo Program Office of the Saturn IB and Saturn V launch vehicles by the Marshall Space Flight Center and the Apollo spacecraft by the Manned Spacecraft Center. The establishment of appropriate procedures to ensure adequate contractor reporting and weight control of the flight hardware is the responsibility of the appropriate Center and shall be covered by level 2 documentation.

III. DEFINITIONS

The definition of terms used in reporting Apollo-Saturn weights and performance shall be those specified

in SE 005-001-1 "Apollo Program Specification" dated March 1, 1966, Appendix 10.1.

IV. PROCEDURES

The data defined below shall be submitted monthly to the Apollo Program Office, Systems Engineering, code MAS. The data shall be the current values as of the first of the month or the fifteenth of the month at the option of the transmitting agency and shall be transmitted to the Apollo Program Office within 15 calendar days of the above mentioned dates.

The applicable sample forms in Appendix A of Apollo Program document SP-6004, CMO 18-001-1, "Mass Properties Standard", dated June 1, 1965, shall be used as a guide for the format of the data submittals.

The monthly reports on each vehicle shall continue until launch of the vehicle and the final monthly report shall include the engine performance and weight data at launch to the same detail as the prior monthly reports.

V. DATA REQUIREMENTS

The data tabulated below shall be submitted on a vehicle by vehicle basis for each stage, interstage and instrument unit of the Saturn launch vehicles and for each module, module stage, adapter and LES for each Apollo spacecraft loaded for the appropriate Apollo-Saturn flight mission as specified in the Apollo Flight Mission Assignments document.

1. Engine performance data including mixture ratio, specific impulse and thrust
2. Weight data including dry and separation weight in the launch vehicle and inert weight, useable propellant and separation, or injection weight in the spacecraft
3. Payload capability including reserves and payload margins in the launch vehicles and total weight including reserves and performance margins in the spacecraft

4. Weight and performance history during the mission tabulated with respect to time or profile event. Weight losses which occur over a period of time, as with full thrust or useful velocity propellants, may be carried as a single total or associated with individual profile events. Propellants carried but not given full thrust or velocity credit in performance calculations shall be identified.
5. The magnitude of changes in weight and performance occurring during the month shall be identified as to subsystem and tabulated with a statement identifying the reason for each change. Pending changes are to be separately identified and tabulated with a statement identifying the reason for each change. In addition to the data tabulated above the submittal shall include weight data for each system and subsystem of the operational Saturn IB launch vehicle (AS 206), Saturn V launch vehicle (AS 504), Block I CSM (012), and the operational spacecraft (CSM 103 and LEM 4).

VI. RESPONSIBILITIES

The Saturn I/IB Program Manager shall be responsible for reporting the Saturn IB launch vehicle weights and performance. The Saturn V Program Manager shall be responsible for reporting the Saturn V launch vehicle weights and performance. The Apollo Spacecraft Program Manager shall be responsible for reporting the Apollo spacecraft weights and performance.

STANDARD DISTRIBUTION FOR APD's

HEADQUARTERS:

MA/Phillips
MA-1/Schaibley
MA-2/Keegan
MA-3/McGregor
MA-4/Turnock
MA-5/Russell
MA-6/Reiffel
MAO/Holcomb (4)
MAP/Seccomb
MAP-1/Skaggs (6)
MAP-2/Winn (2)
MAP-3/Waller
MAP-4/Linn (3)
MAP-5/Newman (2)
MAR/Lemke (7)
MAS/Thompson (8)
MAT/Dey (9)

M/Mueller
MD/Elms
MDM/Bogart
MDP/Jones
M-1/Bowman
MB/Armstrong
MC/Freitag
MCL/Achley
MLT/Savage
ML/Disher (8)
ML/Duncan
ML/Mong
MP/Lilly (2)
MPP/Rafel (2)
MPR/Johnson
MS/Cotton
MSR/Davis

MF/Dorfman (2)
MT/Gray (9)
MO/Christensen (10)
MM/Bollerud

PT/Maggin (2)
SM/Foster (4)
SL/O'Bryant
TN/Brockett

CENTERS:

MSFC/von Braun (Director)
MSFC/Mrazek (R-R&VE)
MSFC/O'Connor (I-DIR)
MSFC/James (I-I/IB-MGR)
MSFC/Rudolph (I-V-MGR)
MSFC/Belew (I-E-MGR)
MSFC/Hans Maus (E-DIR)
MSFC/Data Manager (95)
MSFC/Speer (I-MO-MGR)
(R. Goldston, I-RM-M)

MSC/Gilruth (Director)
MSC/Shea (PA)
MSC/Faget (EA)
MSC/Kraft (FA)
MSC/Data Manager (60)
Tash (HL)

KSC/Debus (Director)
KSC/Petrone (DIO)
KSC/McCoy (PPR-1)
KSC/Greenglass (PPR-3)
KSC/Mathews (PPR-4)
KSC/Clearman (PPR-5)
KSC/Data Manager (60)
(A. Harper, PPR 33)